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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/778,996	02/07/2001	Konstantinos I. Papathomas	END920000065USI	8725

7590 07/13/2004

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EXAMINER

KEEHAN, CHRISTOPHER M

ART UNIT	PAPER NUMBER
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1712

DATE MAILED: 07/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/778,996

Applicant(s)PAPATHOMAS, KONSTANTINOS
I.**Examiner**

Christopher M. Keehan

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,8,14,18-29,31,37,39,41,43,44 and 46-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1,5,6,8,14,18-29,31,37,39,41,43,44 and 46-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

Applicant's appeal brief, filed 5/6/04, has been considered. However, further searching has revealed pertinent art that has been applied to the case as set forth below. Therefore, the finality of the application has been withdrawn.

Claim Rejections - 35 USC § 103

The rejection of claims 1, 5, 6, 14, 18-29, 31, 37, 39, 41, 43, and 48-50 under 35 U.S.C. 103(a) as being unpatentable over Christie et al. (5,668,059) has been maintained and is as set forth in the previous office action.

The rejection of claims 1, 5, 6, 8, 18-20, 23, 25-29, 31, 39, 41, 44, and 46-50 under 35 U.S.C. 103(a) as being unpatentable by Arldt et al. (5,766,670) has been withdrawn in light of a new rejection.

The rejection of claims 1, 5, 6, 8, 44, and 48 under 35 U.S.C. 103(a) as being unpatentable over Day et al. (6,444,407 B1) has been maintained and is as set forth in the previous office action.

New Claim Rejections - 35 USC § 102

Claims 1, 5, 8, 14, 18-23, 25, 26, 28, 31, 37, 39, 41, 44, and 46-50 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiobara et al. (6,376,100 B1).

Regarding claims 1, 5, 8, 18, and 25, 26, 28, 31, Shiobara et al. disclose an electronic package comprising a substrate having an upper surface, a semiconductor chip mounted on a portion of the upper surface and electrically coupled to the substrate, the semiconductor chip having a bottom surface and at least one edge surface being substantially perpendicular to the bottom surface, and encapsulant composition positioned on at least a portion of the upper surface of the substrate and against at least a portion of the at least one edge surface of the semiconductor chip (Figure 2A) comprising a resin material of epoxy resin comprising glycidyl ethers (col.2, line 44-col.3, line 19), a flexibilizing agent selected from the group as instantly claimed (col.9, line 12-col.12, line 61), comprising 2 to 15 parts by weight of the composition (col.12, lines 57-61), and a filler material comprising substantially spheroidal particles, with a maximum particle size included in applicant's range (col.3, lines 20-35).

Regarding claims 14 and 37, Shiobara et al. disclose a coupling agent positioned on at least a portion of the spheroidal filler (col.3, lines 44-52).

Regarding claims 19-23, Shiobara et al. disclose a substrate as claimed (col.14, lines 37-38 and 48-49). It is the examiner's position that an FR-4 substrate is an epoxy substrate with glass fiber reinforcement, and a BT substrate is a bismaleimide-triazine substrate.

Regarding claim 39, Shiobara et al. disclose a catalyst material selected from the group as instantly claimed (col.8, lines 10-40).

Regarding claim 41, the same reasoning as set forth above for claims 1 and 18 also applies to claim 41, as the claimed subject matter is essentially the same, except for the method steps as claimed. Shiobara et al. disclose adding to the first quantity of resin material a second quantity of flexibilizing agent by homogenizing the flexibilizing agent in the first quantity by reacting the resin material and the flexibilizing agent together (col.12, lines 57-61) at a temperature of greater than about 100°C (col.13, lines 30-34).

Regarding claims 44, 46, and 47, Shiobara et al. disclose a flexibilizer comprising a thermoplastic material containing a thermoplastic oligomer backbone (col.9, line 12- col.12, line 61).

Regarding claims 48-50, Shiobara et al. disclose a maximum particle size of up to 50 microns, which exceeds 31 microns (col.3, lines 20-35).

New Claim Rejections - 35 USC § 103

Claims 23 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiobara et al. (6,376,100 B1) in view of Christie et al. (5,668,059). Shiobara et al., as applied above, are as set forth and incorporated herein. Regarding claim 23, Shiobara et al. do not appear to specifically disclose the ceramic substrate as claimed. Christie et al. disclose an encapsulant composition comprising a resin material selected from the group consisting of epoxy and cyanate ester resins, wherein the resin material

Art Unit: 1712

is a cycloaliphatic epoxide, derived from unsaturated aromatic hydrocarbon compounds, comprising glycidyl ethers, wherein the resin material is at least a dicyanate ester, and wherein the resin material comprises about 20 percent to about 55 percent by weight of the composition (col.3, line 20-col.9, line 46), a flexibilizing agent (col.11, lines 14-33), and a filler material comprising substantially spheroidal particles, each having a diameter of less than about 41 microns (col.9, line 46-col.10, line 10), and a ceramic substrate used in the same application as applicant (col.12, line 12-col.14, line 45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for Shiobara et al. to have used a different substrate, such as a ceramic substrate as that taught by Christie et al., because Christie et al. teach that using a ceramic substrate produces improved flow characteristics resulting in a higher quality product.

Regarding claim 43, Shiobara et al. do not appear to specifically disclose homogenizing the materials under vacuum. Christie et al. disclose an encapsulant composition comprising a resin material selected from the group consisting of epoxy and cyanate ester resins, wherein the resin material is a cycloaliphatic epoxide, derived from unsaturated aromatic hydrocarbon compounds, comprising glycidyl ethers, wherein the resin material is at least a dicyanate ester, and wherein the resin material comprises about 20 percent to about 55 percent by weight of the composition (col.3, line 20-col.9, line 46), a flexibilizing agent (col.11, lines 14-33), and a filler material comprising substantially spheroidal particles, each having a diameter of less than about 41 microns (col.9, line 46-col.10, line 10), wherein the homogenizing step is performed

Art Unit: 1712

under vacuum (col.11, lines 57-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made for Shiobara et al. to have performed the homogenizing under vacuum as taught by Christie et al. to the composition of Shiobara et al. because Christie et al. teach that homogenizing under vacuum improves the rate of the volatilization of solvents, producing a more efficient process.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiobara et al. (6,376,100 B1) in view of Potter (Epoxide Resins). Shiobara et al., as applied above, are as set forth and incorporated herein. Shiobara et al. disclose a cycloaliphatic epoxide of the cyclopentadiene type (col.2, line 54). Shiobara et al. do not appear to disclose the derivation thereof. Potter discloses a typical process for forming cycloaliphatic epoxide resins by using cyclopentadiene (page 135, bottom of the page). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the cyclopentadiene type epoxide of Shiobara et al. to have been produced by the method of Potter because Potter teaches that cyclopentadiene type epoxide resins can be made according to this process.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nguyen et al. (5,250,600) disclose a cyanate ester resin comprising a flexibilizer present at 8-32% by weight, and a filler. Nguyen et al. do not teach or disclose a filler with a particle size and a flexibilizer amount as claimed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Keehan whose telephone number is (571) 272-1087. The examiner can normally be reached on Monday-Friday, from 6:30 to 3:00.

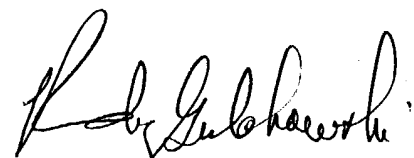
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher Keehan



June 28, 2004



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